इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 9126-3 (1979): Tolerances for Castings and Finishing of Ships Screw Propellers, Part III: Methods of Measurement [TED 17: Shipbuilding]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA
JURIS
NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 9126 (Part III) - 1979

(Reaffirmed 2002)

Indian Standard

TOLERANCES FOR CASTINGS AND FINISHING OF SHIPS' SCREW PROPELLERS

PART III METHODS OF MEASUREMENT

UDC 629·12·037·1 : 621·746/747 : 621·753·1

© *Copyright* 1979

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

~~Price Rs 3·00~~ Gr 2

September 1979

Indian Standard

TOLERANCES FOR CASTINGS AND FINISHING OF SHIPS' SCREW PROPELLERS

PART III METHODS OF MEASUREMENT

Shipbuilding Sectional Committee, MCPD 1

Chairman	*Representing*
SHRI S. PARMANANDHAN	Ministry of Defence (NHQ)
Members	
DIRECTOR OF NAVAL CONSTRUCTION (*Alternate* to Shri S. Parmanandhan)	
SHRI V. G. DAMLE	AFCO Ltd, Bombay; *and* Institute of Marine Technologists, Bombay
SHRI R. D. PARALKAR (*Alternate*)	AFCO Ltd, Bombay
SHRI R. S. SACHDEV (*Alternate*)	Institute of Marine Technologists, Bombay
SHRI A. T. JOSEPH (*Alternate*)	Institute of Marine Technologists, Bombay
SHRI I. N. PRADHAN (*Alternate*)	Institute of Marine Technologists, Bombay
SHRI D. B. IRANI	Directorate General of Shipping, Bombay
SHRI J. S. BHATTI (*Alternate*)	
SHRI MADAN L. KOCHHAR	American Bureau of Shipping, Bombay
SHRI G. S. K. MOHAN RAO (*Alternate*)	
SHRI P. L. MEHTA	The Shipping Corporation of India Ltd, Bombay
SHRI S. SUNDARAM (*Alternate*)	
CDR N. A. MULLERWORTH	Ministry of Defence (DGI)
LT CDR MEHR SINGH (*Alternate*)	
SHRI I. N. PRADHAN	The Indian National Shipowners Association, Bombay
PRESIDENT	The Institute of Marine Engineers (Indian Division Council), Bombay
SHRI R. K. MEHROTRA (*Alternate*)	
SHRI H. K. KAUL (*Alternate*)	
SHRI K. S. MANI (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1979
INDIAN STANDARDS INSTITUTION
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Capt N. P. Mukundan (*Alternate*)	
Shri P. C. Kumar (*Alternate*)	
Shri T. S. Rajan	Ericson & Richards, Bombay
Shri C. M. Rao	Hindustan Shipyard Ltd, Visakhapatnam
Shri S. Srinivasan (*Alternate*)	
Shri H. S. Rao	Indian Register of Shipping, Bombay
Shri S. Ratra	Lloyd's Register of Shipping, Bombay
Shri D. Madhok (*Alternate*)	
Dr M. K. Ghosh Roy	Garden Reach Shipbuilders & Engineers Ltd, Calcutta
Shri S. K. Bose (*Alternate*)	
Shri S. Sankaranarayanan	Directorate General of Technical Development, New Delhi
Shri H. K. Sharma (*Alternate*)	
Shri B. R. Sawarkar	Cochin Shipyard Ltd, Cochin
Shri P. R. Govil (*Alternate*)	
Shri G. Sinha	SF India Ltd, Calcutta
Shri H. Svensson (*Alternate*)	
Shri T. N. Sujan	Larsen & Toubro Ltd, Bombay
Shri A. B. Thakur	Ministry of Shipping & Transport
Shri S. Raghavan (*Alternate*)	
Shri P. S. Das, Director (MCPD)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri V. K. Sehgal
Assistant Director (MCPD), ISI

Indian Standard

TOLERANCES FOR CASTINGS AND FINISHING OF SHIPS' SCREW PROPELLERS

PART III METHODS OF MEASUREMENT

0. FOREWORD

0.1 This Indian Standard (Part III) was adopted by the Indian Standards Institution on 30 March 1979, after the draft finalized by the Shipbuilding Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 The accuracy of the measuring instrument should be at least equal to half the tolerance on the dimension or dimensions to be measured and the minimum accuracy of the instrument for geometric measurement to be 0·25 mm.

0.3 This standard is one of a series of Indian Standards on tolerances for castings and finishing of ships' screw propellers. The other parts in the series are:

IS : 9126 (Part I)-1979 Tolerances for castings and finishing of ships' screw propellers: Part I Propellers of diameters between 0·8 and 2·5 metres

IS : 9126 (Part II)-1979 Tolerances for castings and finishing of ships' screw propellers: Part II Propellers of diameter greater than 2·5 metres

1. SCOPE

1.1 This standard (Part III) specifies the methods for measurement of parameters of ships' screw propellers given in Parts I and II of this standard.

2. METHODS OF MEASUREMENT

2.1 Pitch — The principle of measurement consists in setting out along a helicoidal line of radius r a certain length PQ (*see* Fig. 1) corresponding to the desired angle α and in measuring the difference h in the heights of the points *P* and *Q* with respect to a reference plane. The length *PQ* may be set out with the help of a marking gauge or it may be set out from the angle α read on a part of a graduated ring of small diameter (*see* Fig. 2) or of a large diameter (*see* Fig. 3) equal to or greater than the diameter of the screw propeller.

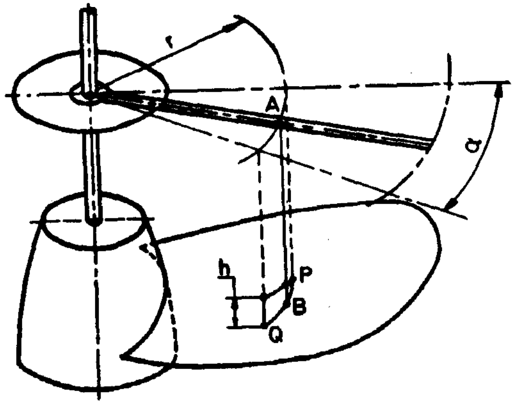


FIG. 1 METHOD OF MEASUREMENT OF PITCH

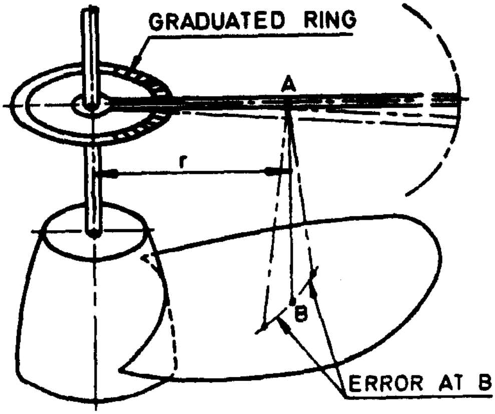


FIG. 2 METHOD OF MEASUREMENT OF PITCH BY GRADUATION ON A SMALL DIAMETER RING

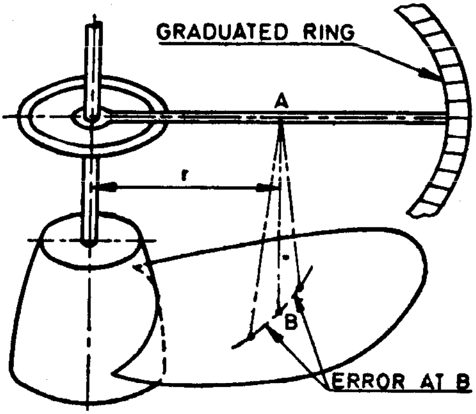


Fig. 3 Method of Measurement of Pitch by Graduation on a Large Diameter Ring

2.1.1 The local pitch at a point *B* is determined by measuring the difference in height between two points *P* and *Q* situated at equal distances from point *B* (*see* Fig. 1) and on either side of the latter ($BP = BQ$) and by multiplying the difference in height by $\frac{360}{\alpha}$.

2.1.1.1 The number of pitch measurements at any radius and each measurement span should be sufficient to ensure adequate accuracy in the pitch measurement in compliance with **0.2**. If necessary the number of measurements may be reduced in order to comply with **0.2.**

2.1.2 Pitch per blade per radius is determined for each radius by multiplying the difference in height between the extreme measuring points by $\frac{360}{\alpha}$.

2.2 Blade Section Thickness — The thickness of the cylindrical section at a point *S* should be measured along direction *SV* (*see* Fig. 4) on the plane tangent to a coaxial cylinder and perpendicular to the line of the pressure side of the cylinder section (not along direction *SU* perpendicular to the pressure side surface) if the thickness is defined on the drawing in this way. The thickness can also be measured along direction *ST* parallel to the axis of the screw propeller, if the thickness is defind on the drawing in this way.

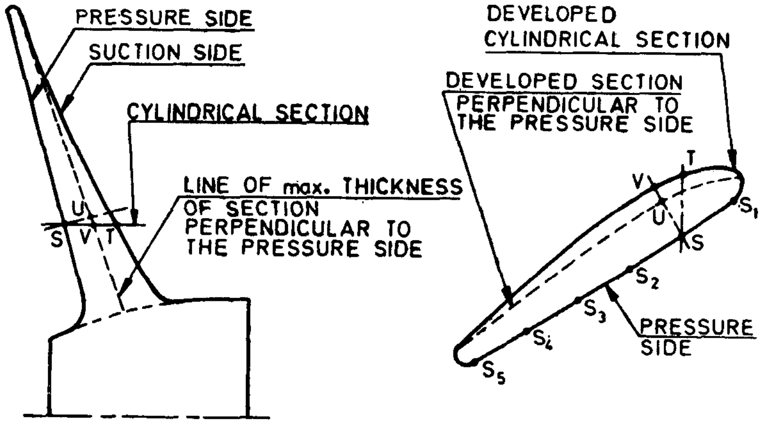

PRESSURE SIDE
SUCTION SIDE
CYLINDRICAL SECTION
LINE OF max. THICKNESS OF SECTION PERPENDICULAR TO THE PRESSURE SIDE
U
S
V
T
DEVELOPED CYLINDRICAL SECTION
DEVELOPED SECTION PERPENDICULAR TO THE PRESSURE SIDE
T
V
U
S
S1
S2
S3
S4
S5
PRESSURE SIDE

Fig. 4 Method of Measurement of Thickness of Blade

2.2.1 The maximum thickness at each radius is determined by means of a pair of outside calipers or from the profile obtained by plotting the thickness at various points S, S_1, S_2, S_3, etc.

2.2.2 For checking the leading and trailing edges section templates formed to the pitch and radius of the section to be tested can be used. The minimum length of the templates should be 15 percent of the length of the section or the following values, whichever is the smaller:

a) 60 mm for propellers of dia between 0·8 and 2·5 mm; and

b) 125 mm for propellers of dia above 2·5 mm.

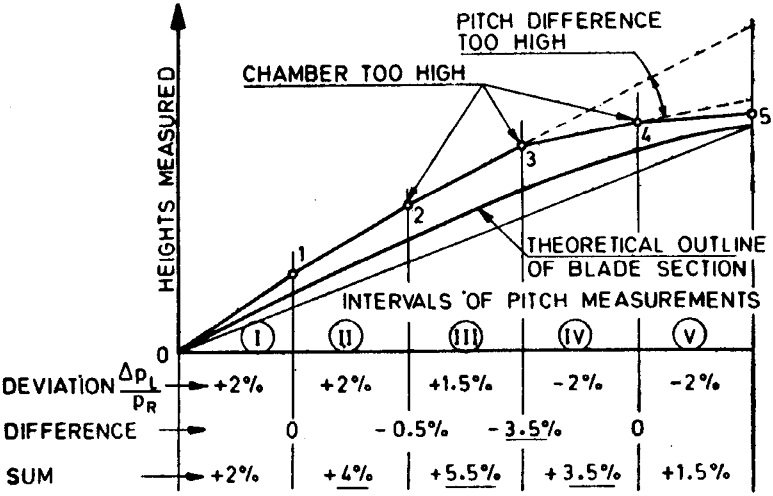
The leading and trailing edges should be checked by templates for accuracy classes S and I. For other classes of accuracy the checking may be carried out on the request of the user.

2.3 Form of Blade Section

2.3.1 Tolerances of form of section of the blades apply only to propellers of classes S and I and to the same radii as those at which the pitch is measured.

2.3.2 To avoid discontinuity of form, the deviation of consecutive measurements of local pitch or thickness shall not differ from each other by more than half the tolerance envelope (*for example*, if the tolerance is + 2 percent to 2 percent, the permitted difference between consecutive deviations is 2 percent).

2.3.3 To avoid undue deviation in overall camber, the algebraic sum of the percentage deviations of consecutive measurements of local pitch shall not exceed 1·5 times the allowable tolerance (*for example*, if the tolerance is ± 2 percent, the sum of consecutive deviations must lie between ± 3 percent) (*see* Fig. 5).



PROPELLER CLASS I

On the figure the deviations are multiplied by 20.

The values which are too high are underlined.

FIG. 5 CURVE FOR FORM OF BLADE SECTION

2.3.4 Alternatively, the satisfactory continuity of the cylindrical section may be verified with the help of flexible templates. The leading and trailing edges should be checked by templates or equivalent devices to demonstrate accuracy with respect to the design within the following tolerances of the face and the back:

a) ± 0·5 mm for Class S; and
b) ± 0·75 mm for Class I.

Otherwise if agreed to between the manufacturer and the user the edges may be checked by templates made in three parts for each edge — a short nose template for checking the final edge detail with a suitable locating arm bearing on the face and two fairing templates from the nose, one bearing on the face and one bearing on the back, each covering about 20 percent of the blade length, but not necessarily more than 300 mm. These templates should fit with a maximum gap of 0·25 mm for Class S and 0·35 mm for Class I.

2.4 Blade Inclination — The blade inclination is characterized by the position of the reference line *PP'* (*see* Fig. 6). This is expressed in terms of the distance to a plane *W* perpendicular to the axis of rotation of the screw propeller at three points at least, say — *A*, *B* and *C* situated at 0·3*R* or 0·4*R*, 0·6*R* or 0·7*R*, 0·9*R*, or 0·95*R*. The distances *b*(A), *d* (B) and *d*(C) are measured. The tolerance specified in Table 7 of IS : 9126 (Part I)-1979* and IS : 9126 (Part II)-1979† are applicable to these distances. The same tolerances (and not double tolerances) are applicable to differences, such as *d* (B) — *d* (C) for the same blade and to differences. such as d_1 (C) — d_2(C) for two consecutive blades No. 1 and 2.

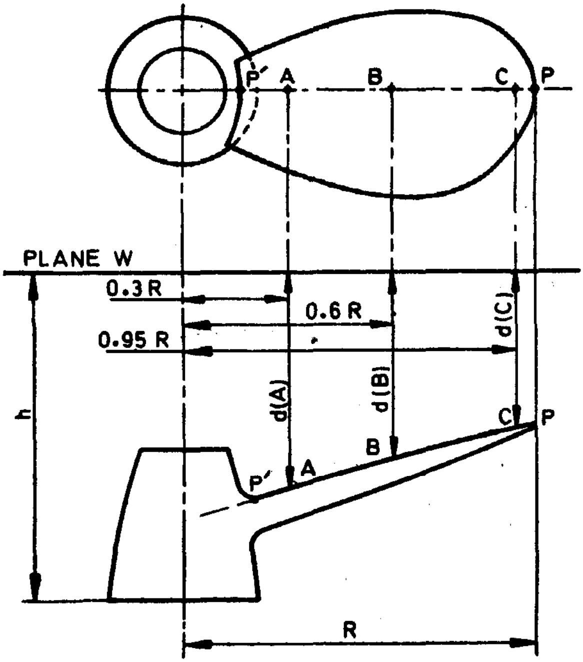


FIG. 6 MEASUREMENT OF BLADE INCLINATION

---

*Tolerances for castings and finishing of ships' screw propellers: Part I Propellers of diameters between 0·8 and 2·5 metres.

†Tolerances for castings and finishing of ships' screw propellers: Part II Propellers of diameter greater than 2·5 metres.